



United States Government

Department of Energy

# memorandum

Carlsbad Field Office  
Carlsbad, New Mexico 88221

DATE: May 14, 2004

REPLY TO  
ATTN OF: CBFO:QA:DSM:GS:04-1508:UFC 2300.00

SUBJECT: Report of Audit A-04-05 of Los Alamos National Laboratory TRU Waste Characterization Activities Using the Services of the Washington TRU Solutions LLC Central Characterization Project

TO: James Nunz, LASO



The Carlsbad Field Office (CBFO) conducted a certification audit of the Los Alamos National Laboratory (LANL), TRU waste characterization activities using the contracted services of the Washington TRU Solutions LLC (WTS), Central Characterization Project (CCP) on April 26-30, 2004. Attached is the report for this audit. The audit team concluded that the LANL/CCP technical and quality assurance procedures and processes audited were adequate, and the majority of processes were considered to be satisfactorily implemented and effective. There were three key processes, quality assurance records management, the software quality assurance process, and project-level data verification and validation that were determined to be marginally implemented and marginally effective.

As a result of the audit five CBFO Corrective Action Reports (CARs) were issued. In addition, the audit team identified five concerns that were corrected during the audit (CDAs), five concerns identifying conditions that, if uncorrected, may result in conditions adverse to quality (Observations), and provided two recommendations for improvement of the LANL/CCP processes.

This audit also verified that the LANL/CCP program had not completed participation in the Performance Demonstration Program (PDP). It should also be noted that the LANL/CCP program must successfully pass the PDP program prior to submittal of the final audit report to the New Mexico Environment Department.

If you have any questions or comments concerning this report, please contact me at (505) 234-7491.

Dennis S. Miehl  
Quality Assurance Specialist

Attachment

040512



James Nunz

-2-

May 14, 2004

cc: w/attachment

A. Holland, CBFO \*ED

M. Navarrete, CBFO \*ED

K. Watson, CBFO \*ED

D. Winters, DNFSB \*ED

T. Hedahl, WTS \*ED

D. Haar, WTS \*ED

A. Fisher, WTS \*ED

S. Zappe, NMED \*ED

S. Holmes, NMED \*ED

R. Joglekar, EPA \*ED

E. Feltcorn, EPA \*ED

M. Eagle, EPA \*ED

E. Bradford, CTAC \*ED

L. Greene, WRES \*ED

K. Dunbar, WRES \*ED

CBFO QA File

CBFO M&RC

U.S. DEPARTMENT OF ENERGY  
CARLSBAD FIELD OFFICE

AUDIT REPORT  
OF  
LOS ALAMOS NATIONAL LABORATORY  
UTILIZING THE  
CENTRAL CHARACTERIZATION PROJECT

Los Alamos, New Mexico

AUDIT NUMBER A-04-05

April 26-30, 2004

TRANSURANIC WASTE CHARACTERIZATION AND CERTIFICATION  
PROGRAM



Prepared by:

*A. Earl Bradford*

A. Earl Bradford, CTAC  
Audit Team Leader

Date:

*5/13/04*

Approved by:

*Ava L. Holland* FOR

Ava L. Holland, CBFO  
Quality Assurance Manager

Date:

*5-14-04*

## 1.0 EXECUTIVE SUMMARY

The Central Characterization Project (CCP) was developed by Washington TRU Solutions (WTS) to provide transuranic (TRU) waste characterization, certification, and transportation services to TRU waste generator sites. These services include the necessary management and administrative controls to ensure the provided services are in compliance with regulatory requirements. The CCP provides these services under contract to those waste generator sites that request support or lack the expertise, program infrastructure, or equipment to characterize TRU waste for shipment to and disposal at the Waste Isolation Pilot Plant (WIPP).

Carlsbad Field Office (CBFO) Audit A-04-05 was conducted at Los Alamos National Laboratory (LANL), April 26-30, 2004, to evaluate the CCP characterization and certification services that were contracted to the University of California. This audit was conducted to evaluate the CCP TRU waste characterization and certification activities related to Summary Category Group S3000 (homogeneous solid waste) and S5000 (debris waste). The audit team assessed the adequacy, implementation, and effectiveness of the technical and quality assurance (QA) activities.

The audit scope included assessment of the physical characterization processes and activities being conducted on behalf of LANL. The activities evaluated included characterization with mobile real-time radiography (RTR) equipment, visual examination (VE), including the VE technique, headspace gas (HSG) sampling using sample canisters and HSG analysis on-site using an Entech-Agilent analysis system, and analysis off-site using an independent analysis laboratory. Nondestructive assay (NDA) equipment evaluated included a high efficiency neutron counter (HENC), a portable tomographic gamma scanner (PTGS) system, and a fixed energy response function analysis with multiple efficiencies (FRAM) system used for isotopic determination. The process for developing the acceptable knowledge (AK) documentation was also evaluated.

The audit team concluded that the CCP technical and QA procedures were adequate relative to the flow down of requirements from the CBFO Quality Assurance Program Document (QAPD), the Waste Analysis Plan (WAP) of the WIPP Hazardous Waste Facility Permit (HWFP) and the WIPP Waste Acceptance Criteria (WAC). The audit team also concluded that the assessed activities were being satisfactorily implemented in accordance with the CCP Quality Assurance Project Plan (QAPjP) and the implementing procedures, with the exception of the processes related to Software QA, Project-Level Data Verification and Validation, and Records Management, which were determined to be marginally implemented. The established technical processes and the QA program were determined to be effective, except for the aforementioned processes which, again, were determined to be marginally effective. In addition, the LANL/CCP program had not as yet participated in the NDA or HSG

Performance Demonstration Program (PDP), and this process was identified as being indeterminate. The LANL/CCP program must complete this process successfully prior to submittal of the final audit report for their initial site certification. A Summary Table of Audit Results is provided in Attachment 2.

The audit team identified six conditions adverse to quality (CAQs) that resulted in the issuance of five CBFO corrective action reports (CARs). Five isolated deficiencies requiring only remedial corrective actions were corrected during the audit (CDA). Five Observations and two Recommendations were identified and are being offered for LANL/CCP management consideration. The CARs, CDAs, Observations, and Recommendations are described in Section 6.

Concurrent with the CCP audit, the Environmental Protection Agency (EPA) inspection personnel observed the CBFO quality and technical evaluations and verified the performance of replicate NDA scans for three selected drums.

## 2.0 SCOPE

CBFO Audit A-04-05 was conducted to evaluate the adequacy, implementation, and effectiveness of the CCP technical processes used to perform TRU waste characterization activities for homogeneous solid and debris wastes generated at LANL. In addition, the audit team witnessed the operation of the RTR, HSG, VE and NDA equipment used to characterize both S3000 and S5000 wastes in accordance with the CCP implementing documents.

The following QA elements related to the characterization activities for both the solid and debris wastes were evaluated in accordance with the CBFO QAPD:

- Organization and Quality Assurance Program (Program Interfaces and Statement of Work)
- Nonconformances and Corrective Action
- Personnel Qualification and Training
- Documents & Records
- Work Processes
- Procurement
- Inspection and Testing
- Control of measuring and test equipment (M&TE) for data collection
- Audits/Assessments
- Sample Control
- Software QA

The following technical elements were evaluated to verify compliance with the WAP and the WAC:

- Data Validation & Verification (V&V)
- Acceptable Knowledge (AK)  
Nondestructive Assay (NDA)
- Visual Examination (VE)
- Real Time Radiography (RTR)
- Headspace Gas (HSG) Sampling and Analysis
- Waste Certification (e.g., Waste Stream Profile Form)
- WIPP Waste Information System (WWIS)
- Performance Demonstration Program (PDP)
- Waste Analysis Plan (WAP), Section B6

The evaluation of waste characterization and certification activities and documents was based on current revisions of the following documents:

- *Quality Assurance Program Document (QAPD)*, DOE-CBFO-94-1012
- *Hazardous Waste Facility Permit Waste Isolation Pilot Plant EPA No. NM4890139088-TSDF*, by the New Mexico Environment Department, dated October 27, 1999, including all applicable modifications
- *Contact-Handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant (WAC)*, DOE/WIPP-02-3122

Programmatic and technical checklists were developed from the current revisions of the following documents:

- *CCP Transuranic Waste Quality Assurance Characterization Project Plan (QAPjP)*, CCP-PO-001
- *CCP Transuranic Waste Certification Plan*, CCP-PO-002
- *CCP TRUPACT-II Authorized Methods for Payload Control (TRAMPAC)*, CCP-PO-003
- *CCP / LANL Interface Document*, CCP-PO-012
- Related CCP QA and technical implementing procedures (see Attachment 3)

## **AUDIT TEAM, INSPECTORS, AND OBSERVERS**

### **AUDITORS/TECHNICAL SPECIALISTS**

Dennis Miehl	CBFO QA Representative
Martin Navarrete	CBFO QA Representative
Earl Bradford	Audit Team Leader, CTAC
Charley Riggs	Auditor, CTAC
Steve Calvert	Auditor/CTAC QA Manager
Priscilla Dugger	Auditor, CTAC
Tammy Bowden	Auditor, CTAC
Porf Martinez	Auditor, CTAC
Norman Frank	Auditor, CTAC
Patrick Kelly	NDA Technical Specialist, CTAC
Wayne Ledford	RTR/VE Technical Specialist, CTAC
BJ Verret	HSG Technical Specialist, CTAC
Dick Blauvelt	AK Technical Specialist, CTAC

### **INSPECTORS/OBSERVERS**

Rajani Joglekar	Lead EPA Inspector
Ed Felcorn	EPA Inspector
Connie Walker	EPA Inspector/Contractor
Dave Stuenkel	EPA Inspector/Contractor
Jim Oliver	EPA Inspector/Contractor
Jerry Rossman	EPA Inspector/Contractor
Ivy Porpotage	EPA Inspector/Contractor
Steve Zappe	NMED Observer
Steve Holmes	NMED Observer
Kevin Krause	NMED Observer
Carl Chavez	NMED Observer

### **AUDIT PARTICIPANTS**

A pre-audit conference was held at LANL, Technical Area (TA) #21, Building 210, Room 142, on April 26, 2004. Daily management briefing meetings were held with LANL/CCP management to discuss the progress of the audit and potential deficiencies. The audit was concluded with a post-audit conference held in the Oppenheimer Building, Room 213, on April 30, 2004. A list of CCP and LANL personnel contacted during the audit is included as Attachment 1.

## **SUMMARY OF AUDIT RESULTS**

### **5.1 Program Adequacy, Implementation, and Effectiveness**

The audit team concluded that the CCP technical and QA procedures adequately reflect the appropriate requirements from the CBFO QAPD, the WIPP HWFP, and the WAC. The audit team concluded that the defined QA program is being satisfactorily implemented in accordance with the CCP QAPjP and the CCP implementing procedures, with the exception of QA records management and the software QA process. The audit team determined that both the QA records management process and the software QA process were marginally implemented and marginally effective. The audit team determined that the CCP characterization activities, with the exception of project-level data V&V, as described in the associated CCP implementing procedures, are adequate, satisfactorily implemented, and effective. The audit team determined that the project-level data V&V process was marginally implemented and marginally effective because of the number of deficiencies noted with the completed batch data reports (BDRs) from the various processes.

A Summary Table of Audit Results is provided in Attachment 2 and a list of CCP procedures evaluated during the audit is provided in Attachment 3.

#### **Quality Assurance Program Audit Activities**

The audit team evaluated the adequacy and implementation of documents describing the CCP QA program.

The audit team identified one concern that resulted in the issuance of a CBFO CAR (CAR 04-023). The concern was related to the failure of LANL/CCP personnel to ensure that records were complete prior to placement in CCP record storage. The audit team identified one concern related to the assignment of an incorrect quality level for a procured item that was considered to be an isolated instance and was corrected during the audit (CDA 3). The audit team identified two QA-related conditions that, if uncorrected, could lead to a condition adverse to quality. The first concern (Observation 3) was related to the fact that key documents developed by previous programs had not been transferred to the LANL/CCP document control program. The second concern (Observation 5) was related to the fact that although the LANL/CCP program had identified the appropriate software programs, they had not yet completed a total transfer to the LANL/CCP software control program.

The audit team determined that overall, the CCP QA Program and implementing procedures were adequate, satisfactorily implemented, and effective, with the exception of the QA Records and Software QA activities. The audit team determined that at the time of the audit, these processes were marginally implemented and marginally effective.



The condition adverse to quality, the item corrected during the audit, and the Observations are described in Section 6.

### **5.3 Technical Activities**

The following sections describe the technical activities reviewed during the audit.

#### **5.3.1 Data Verification and Validation**

The audit team evaluated the data V&V process at both the data generation and project levels. The generation-level data reviews are implemented and are required by the process procedures for NDA, RTR, HSG, and VE. The generation-level reviews were verified during process evaluation. CCP project-level reviews are accomplished in accordance with CCP Procedure CCP-TP-001. The audit team verified that the procedure adequately addresses the requirements of the CCP QAPjP.

The audit team identified several concerns that resulted in the issuance of a CBFO CAR (CAR 04-022). The audit team noted that several BDRs exhibited inconsistencies in the way questions on the Site Project Quality Assurance Officer (SPQAO) Nondestructive Examination (NDE) project-level validation checklists were being answered. In addition, other members of the audit team identified similar problems in completed BDRs. The concerns were related to BDRs that identified issues that should have required further actions (see CAR 04-024), BDRs with missing signatures, missing page numbers, unfilled blanks, etc. (see CAR 04-023), and BDRs with obvious mistakes that would indicate a failure to follow procedures (see CAR 04-021). The problems identified by the audit team indicate a lack of attention to detail while preparing BDRs and performing generation-level and project-level review of BDRs.

The audit team determined that the data V&V processes were adequate, but that the processes were marginally implemented and marginally effective.

#### **5.3.2 Acceptable Knowledge/Reconciliation of Data Quality Objectives (DQOs)/Sample Design**

The audit team evaluated the AK process supporting the certification of LANL homogeneous solid and debris wastes to assure compliance with WAP requirements. The audit team examined AK documentation for both waste streams: a non-mixed heterogeneous debris stream from TA-55 that was generated beginning in 2001, and a sludge stream from TA-50 that was generated between 1979 and 1987 and is a mixed TRU solids stream. The associated AK Summary Reports were CCP-AK-LANL-005, *LANL TA-55 Non-Hazardous Heterogeneous Debris Waste Stream LA-NHD01.001*, R.0, dated 3/17/04, and CCP-AK-LANL-004, *LANL TA-50 Radioactive Liquid Waste*

*Treatment Facility Homogeneous Inorganic Solids Non-Cemented Waste Stream  
LA-MIN03.001, R.0, dated 2/24/04.*

The audit team reviewed the AK Summary Reports and attachments, numerous AK source documents, relevant AK discrepancy reports, and NCRs related to prohibited items, as well as the confirmatory testing BDRs for seven containers used for traceability for the two waste streams. In addition, the audit team reviewed the draft waste stream profile forms and AK accuracy reports prepared for the audit. The audit team also verified compliance with requirements for sample design and data analysis for RCRA characterization of the two waste streams.

The audit team also examined the CCP TRAMPAC in two areas supported by AK that are not covered by WAP or WAC requirements. These include a requirement for prohibition of sharps and bracing of heavy objects and a requirement for identification of chemical constituents consistent with those listed in the TRAMPAC tables 4-1 through 4-8.

The audit team identified one concern that resulted in the issuance of a CBFO CAR (CAR-04-025). The concern was related to a CCP TRAMPAC requirement that addresses an action to be performed by the CCP Waste Certification Official (WCO) that is not being done. The audit team provided one recommendation for improvement of the LANL/CCP AK process and the related AK documentation (Recommendation 1). The concern identified several comments meant to improve the AK Summaries and associated attachments. The EPA Inspector participating in the AK evaluations provided several comments, including the need to improve interfaces and ensure that AK radionuclide information is properly used, as appropriate during nondestructive assay. The key issue was for the sludge waste because there can be significant variability of isotopic mix from drum to drum. The audit team recommended that no AK default isotopics be applied when a measurement could not be made. The comments and recommendations associated with this concern were provided to LANL/CCP management during the audit.

The audit team determined that the AK documentation procedure and AK Summary Report were adequate and satisfactorily implemented, and that the AK development process was effective. The AK confirmation processes for the reconciliation of DQOs, and the sample design and data analysis processes are adequate with respect to the WAP requirements.

### **5.3.3 Nondestructive Assay**

The audit team evaluated the procedures and supporting documents for the HENC and PTGS NDA systems operated by the LANL/CCP.

The HENC System is housed in a trailer located in TA-54, Area G, Pad 10 at LANL. The HENC is operated by Canberra Industries (MCS) for CCP and consists of two components: a passive neutron detection system that measures Pu-240<sub>EFF</sub> and a passive gamma detection system. The neutron component performs a quantitative analysis that is used in conjunction with gamma-derived isotopic values to provide assay results for a series of TRU radionuclides. The HENC incorporates a Cf-252 Add-A-Source (AAS) to determine sample-specific matrix corrections and has an operational range of the LLD to 175 g of weapons grade plutonium (WG Pu). The gamma system provides isotopic values using Multi Group Analysis (MGA) and also functions in a stand-alone capacity to provide quantitative values for TRU and other WIPP-tracked radionuclides. The gamma system's operational range with respect to matrix is determined as a function of sample density over the range of 0.018 to 1.64 g/cm<sup>3</sup>. There is no explicit gamma upper mass limit although the system's dead-time functions as a de facto limit. Non-measured WIPP-tracked radionuclides (U-234, Sr-90 and Pu-242) are determined by the application of scaling and/or correlation factors, as described in CCP operational procedures. Additionally, default isotopics based on site-specific AK are used when MGA is unable to produce useable data. The HENC is configured to assay 55-gallon (208-liter) drums of WIPP wastes and had not been previously approved by CBFO for characterizing TRU wastes.

This audit consisted of reviewing LANL/CCP operating procedures and reports for performance testing prepared by MCS. Using the current versions of the procedures provided prior to the audit, a checklist was prepared and used to assess the following aspects of the HENC system:

- Operability and condition of equipment
- System performance testing, including initial calibrations, calibration confirmations and verifications; mass and AAS neutron calibrations and gamma efficiency, and energy calibrations
- Determination and documentation of the HENC's lower limit of detection (LLD) and total measurement uncertainty (TMU)
- Ability of system to discriminate TRU and non-TRU wastes at 100 nCi/gram
- Pedigree and/or traceability of radionuclide sources used for calibrations
- Applicability of the HENC's operational ranges to waste type (matrix) and radionuclide content of samples assayed
- Participation in the CBFO-approved NDA PDP for drums
- Empirical criteria and mechanism to support using neutron/gamma isotopic values or quantitative gamma results
- Implementation and effectiveness of instrument/measurement controls
- Performance and evaluation of the weekly interfering matrix checks
- Completed BDRs to ensure data are reported and reviewed as required

The audit involved interviewing LANL/CCP and contractor personnel, observing operation of the equipment, and examining records.

The audit team identified one concern that resulted in the issuance of a CBFO CAR (CAR 04-024). The concern identified several NDA BDRs that contained flags identifying issues that were not resolved and documented in accordance with the NDA procedure.

The audit team identified three concerns related to the HENC NDA system that were corrected during the audit. The first concern was related to the HENC operating procedure and identified that the procedure did not adequately address the requirements of the WAC with respect to calibration confirmation and verification (CDA 1). The second concern was related to the TMU document and identified that the document did not include the uncertainty associated with the use of the declared isotopics (CDA 4). The third concern was related to the HENC calibration report and noted that the document did not reflect the status of the HENC regarding the operating range and the historical status of the equipment (CDA 5). The audit team identified one concern that, if left uncorrected, could result in a future nonconforming condition (Observation 1). The audit team believed that the number and nature of technical issues related to documents for the HENC indicated that LANL/CCP personnel had not paid sufficient attention to implementing the requirements of DOE/WIPP-02-3122.

The audit team concluded that the HENC NDA system and the operating procedures were adequate, satisfactorily implemented, and effective.

The PTGS system is housed in a trailer located in TA-54, Area G, Pad 10 at LANL. The PTGS is operated by Canberra Industries (MCS) for CCP and consists of a transmission corrected germanium gamma detector with imaging capabilities, transmission correction (Se-75) and rate loss (Cd-109) sources. This system generates data for Pu-239 based on the 414 keV photon line that are combined with gamma isotopics to provide values for a series of TRU radionuclides. Isotopic values are derived from the Fixed Energy Response Function Analysis with Multiple Efficiencies (FRAM) Unit No. 2 that runs MGA. The FRAM unit is not used for quantitative analysis and only provides isotopic values in support of the PTGS. Non-measured WIPP-tracked radionuclides ((U-234, Sr-90 and Pu-242) are determined by the application of scaling and/or correlation factors, as described in CCP operational procedures. Additionally, default isotopics based on site-specific AK are applied when MGA is unable to provide useable gamma data. The PTGS is configured to assay 55-gallon (208-liter) drums of WIPP wastes. Using the current approved revisions of all applicable CCP NDA procedures, a checklist was prepared and used to assess the following aspects of the CCP PTGS system:

- Operability and condition of the PTGS and related equipment
- System performance testing, including initial energy and efficiency calibrations, calibration confirmations and verifications, as applicable
- Determination and documentation of the PTGS LLD and TMU

- Pedigree and/or traceability of radionuclide sources used for calibrations
- Applicability of PTGS operational ranges to waste type (matrix) and radionuclide content of samples assayed
- Participation in the CBFO-approved NDA PDP for drums
- Implementation and effectiveness of instrument/measurement controls
- Performance and evaluation of the weekly interfering matrix checks
- Completed BDRs to ensure data are reported and reviewed as required

The audit involved interviewing LANL/CCP and contractor personnel, observing operation of the equipment, and examining records. The audit team determined that the operating procedures for PTGS instruments were adequate and that the processes were satisfactorily implemented and effective.

The audit team determined that neither of the NDA systems had completed participation in the PDP program.

#### 5.3.4 Real-Time Radiography (RTR)

The audit team evaluated procedures and observed the operation of the two mobile RTR systems at the LANL facility. The procedures reviewed during the audit were CCP-TP-053, *CCP Standard RTR Inspection Procedure*, and CCP-TP-028, *CCP Radiographic Test and Training Drum Requirements*. The audit team reviewed seven BDRs (including drums from both S3000 and S5000 wastes). The audit team reviewed the audio/videotapes for five of the seven BDRs. The audit team observed operations for both RTR units on April 27, 2004. The audit team reviewed RTR operator training files to verify compliance with QAPJP training requirements. In addition, the audit team reviewed the videotapes recording the test drum inspection for two of the RTR operators.

The audit team identified two concerns that resulted in the issuance of a CBFO CAR (CAR 04-021). Both concerns were related to the failure of RTR operations to issue NCRs. The first concern was related to the failure to issue an NCR when lead was found in a drum from a non-hazardous waste stream. The second concern was related to the failure to issue an NCR when the container contents did not match the waste matrix code identified on the RTR data sheet. The audit team identified one concern that was corrected during the audit (CDA 2). The concern was related to one BDR where the image test pattern was not copied onto the QA record copy compact disc. The image test pattern was recorded on the hard drive in RTR Unit 2, and was copied onto the record copy during the audit.

The audit team also identified one condition that, if left uncorrected, could result in a condition adverse to quality (Observation 4). The concern deals with the practices for determining the basis on Volume Utilization Percentage (VUP) for containers undergoing RTR. RTR operators base this determination on the top of the liner, not on the top of the waste. VE operators base their VUP estimate

on the top of the waste in the container. The estimation of VUP should be consistent between RTR and VE operations. In addition, the audit team suggested that LANL/CCP also consider using the WIPP Waste Information System (WWIS) term "Fill Factor" instead of VUP.

The audit team determined that the LANL/CCP RTR processes and procedures were adequate, satisfactorily implemented, and effective for both S3000 and S5000 wastes.

### **Visual Examination**

The audit team evaluated VE operations at the Waste Characterization, Reduction, and Repackaging Facility (WCRRF) (Area TA-50) and TA-54, Area G at the LANL site. VE operations were observed for drum 59399 on April 28, 2004, at TA-50 and drum S850162 on April 29, 2004, at TA-54. The VE procedure used by LANL/CCP was CCP-TP-113, *CCP Standard Waste Visual Examination and Repackaging*. This procedure provides the instructions for VE as a quality control (QC) check on radiography, the option of performing VE in lieu of radiography, and the VE technique. The audit team reviewed eight BDRs during the audit. The audit team also reviewed the audio/videotapes documenting the examinations for four of the eight BDRs (including drums from both S3000 and S5000 summary category groups). The audit team determined that the calculation of the initial S5000 and S3000 miscertification rates had not been completed at the time of the audit because CCP/LANL has not been in operation long enough to have performed VE for the required number of containers. The audit team reviewed training files for VE personnel to verify compliance with QAPjP training requirements.

The audit team identified one condition that, if left uncorrected, could result in a condition adverse to quality (Observation 2). When CCP/LANL processes a container with a deficiency identified by radiography, in this case non-punctured liner lids, the NCR issued by radiography should be referenced in the BDRs so that it is clear that VE did not identify a miscertification by radiography.

The audit team determined that the VE procedure and processes are adequate satisfactorily implemented, and effective.

### **Headspace Gas Sampling and Analysis**

The audit team evaluated HSG sampling of LANL drums for both on-site analysis and analysis by the Idaho National Environmental and Engineering Laboratory (INEEL). On-site HSG analytical operations were also evaluated. The audit team evaluated drum sample-port installation, drum sampling operations, canister sample storage, canister shipment, canister leak-check and cleaning, canister sample analysis, and BDR preparation, and data V&V through the generation level. The audit team observed sampling operations (including

sample port installation and sampling operations) on April 27, 2004. The sampling for both on-site and off-site analysis is identical. The audit team observed on-site analysis of canister samples, on-site canister leak-checks, and canister cleaning operations. In addition, the audit team verified that initial and continuing calibration, bromofluorobenzene (BFB) tune, and QC sample results were acceptable. The audit team reviewed BDRs LA04-HGAS/LA002 and LA04-HGAS/LS001 to evaluate canister analyses performed on-site, including data package preparation and contents. Additionally, the audit team verified data generation-level V&V by the Independent Technical Reviewer (ITR), Technical Supervisor (TS) and Quality Assurance Officer (QAO) for the two selected BDRs. The audit team reviewed sampling BDR LAHS032701 for samples shipped to INEEL. The BDR V&V at the sampling level was verified to be acceptable. The audit team verified that sample temperature monitoring was confirmed and canister documents from INEEL, as well as shipping documents from LANL/CCP to the INEEL, were satisfactory. The auditors were informed that Procedure CCP-TP-082, *CCP Preparing and Handling Waste Drums for Headspace Gas* (used for sampling drums through the carbon filter), was no longer in use. Its use has been precluded by the DART sampling system.

The audit team did not identify any concerns in the HSG sampling and analysis processes and concluded that the HSG sampling and analysis operations were adequate, satisfactorily implemented, and effective.

The audit team verified that HSG analysis for participation in the PDP was in progress for Cycle 18A during the time of the audit. Final results were not available. The LANL/CCP must successfully complete this activity prior to program certification.

### **5.3.7 WWIS Data Entry**

The audit team evaluated the WWIS data entry process and verified that the process and the implementing CCP procedures were in compliance with the requirements of the CCP QAPjP and CCP TRU Waste Certification Plan. The evaluation included a demonstration of the manual data transfer to the WWIS and a QA validation of the entered data. It was demonstrated that data could be successfully input into the WWIS database. It was further demonstrated that the WWIS database accepted and confirmed receipt of data transmitted to the WWIS from the remote location. The generation of record packages was demonstrated, including the printed and verified data entry forms and WWIS acceptance reports. The audit team verified that the LANL/CCP personnel populating and reviewing the spreadsheet had been adequately trained, and had access to the WWIS from LANL/CCP offices.

The audit team made a recommendation for improvement of the WWIS data entry procedure (Recommendation 2). The audit team noted that the data entry procedure could be improved by adding more detail in the initiation process. The

audit team recommended that LANL/CCP cognizant personnel perform a walk-down of the data entry procedure to ensure sufficient detail is included.

The audit team concluded that the WWIS data entry procedure was adequate, satisfactorily implemented, and effective.

#### **5.3.8 Performance Demonstration Program (PDP)**

The audit team verified that neither the NDA or HSG processes completed the PDP at the time of the audit and determined that results of participation were indeterminate. The audit team informed LANL/CCP program management that both the NDA and HSG would have to successfully complete this activity prior to issuance of the final audit report. The audit team will verify successful completion of the PDP and provide the appropriate objective evidence with the B6 checklist when the final audit report is submitted to the New Mexico Environment Department (NMED).

### **CARs, CDAs, OBSERVATIONS, AND RECOMMENDATIONS**

#### **Conditions Adverse to Quality (CARs)**

##### **CAR 04-021**

Drum #59064 in RTR BDR #LA-RTR2-04-0002 contained lead. The waste undergoing RTR was waste from a non-hazardous waste stream, but no NCR was generated. In addition, several containers in RTR BDR #LA-RTR1-04-0002 were listed with a matrix code of S5300 on the RTR data sheet, but the containers contained greater than 50% homogeneous solids (S3000). No NCR was generated, even though the physical form of the waste did not match the waste matrix code.

##### **CAR 04-022**

The SPQAO NDE Project Level Validation Checklists and Summary Forms were not being completed consistently. The checklist has several questions that are answered by checking blocks with Yes or No answers. The assigned SPQAO had checked these questions differently in BDRs where the BDR activities and results were the same (BDRs RTR1-04-001, RTR1-04-004, and RTR2-04-003). In addition, several other concerns identify similar instances where completed BDRs exhibit a lack of attention to detail (CAR 04-021, CAR 04-023 and CAR 04-025).

##### **CAR 04-023**

Four out of the five BDRs provided as "Completed Records" were incomplete. The four BDRs were missing items such as Site Project Manager (SPM) and



SPQAO signatures and page numbers on the table of contents, and had unfilled blanks, missing pagination and illegible pagination (BDRs LA04-HGAS/LS-002, LA04-HGAS/LA-001, LA04-PTGS-001 and LA-RTR1-04-0003).

#### **CAR 04-024**

Four of five NDA BDRs reviewed had problems that were flagged on the Radioassay Data Sheets but had not been resolved and documented on the NDA Comment Resolution Sheets. BDR #LANDA0003 had flags for drums LAS850176 and LAS850170; BDR #LANDA0004 had flags for drums LAS850252, LAS850163, LAS850201, LAS850143 and LA00000059070; BDR #LANDA0005 had flags for drums LAS850287, LAS870640 and LAS850350; BDR #LANDA0001 had flags for drum LA00000059032.

#### **CAR 04-025**

The CCP TRAMPAC, CCP-PO-003, Section 4.3.2, states that the WCO, "compares the payload container inventory with the allowable material/chemical lists in Tables 4-1 through 4-8 of the TRAMPAC in accordance with CCP-TP-030". This procedurally required action was not being done. The WCO only confirms that the characterization data matches the assigned TRUCON Code.

### **6.2 Deficiencies Corrected During the Audit (CDAs)**

The audit team identified five conditions adverse to quality, considered to be isolated deficiencies, that were corrected during the audit.

#### **CDA 1**

Procedure CCP-TP-064, Rev. 1, *CCP Calibrating the High Efficiency Neutron Counter Using NDA 2000*, did not adequately address the requirements of the WAC with respect to calibration confirmation and verification.

Note: The auditors verified that the procedure was revised to correct the condition and released prior to completion of the audit.

#### **CDA 2**

The image test pattern from RTR BDR #LA-RTR2-04-0002 was not recorded on the QA record copy CD. The image test was performed and was recorded on the hard drive in RTR Unit #2.

Note: The image test pattern was copied to the CD and verified by the audit team.

### CDA 3

The CCP Quality Level Database and associated QA Grading Level Determination Checklist both identified HSG-ASTM Type I or II Water as QA Level 0. The WAP requires the use of ASTM Type I or II water for maintaining humidity control. The QA level determination checklist contains two sections that indicate a higher QA level should have been applied.

Note: The auditor verified that a new grading sheet was initiated and identified the item as QA Level 1 and the CCP Quality Level Database was revised accordingly.

### CDA 4

The NDA TMU Document, *Total Measurement Uncertainty for the MCS HENC #1 with Integral Gamma Spectrometer*, C1-HENC-TMU-101, did not include the uncertainty associated with the use of the declared isotopics.

Note: The audit team verified that the TMU document was revised to correct the condition.

### CDA5

The NDA document, *Calibration and Report for the MCS HENC #1 Including Passive Neutron Calibration Verification and Gamma Spectrometer Calibration and Confirmation*, MCS-HENC1-NDA-1001, did not reflect the status of the HENC regarding the operating range and the historical status.

Note: The audit team verified that the calibration report was revised to correct the condition.

## 6.1 Observations

The audit team identified five conditions that, if left uncorrected, could lead to conditions adverse to quality. These conditions were reported as Observations, and were provided to LANL/CCP management for consideration.

### Observation 1

The amount and nature of the issues related to the NDA requirements documents associated with the HENC indicate that LANL/CCP personnel have not paid sufficient attention to the requirements of the CH-WAC. Examples include Operating Procedure CCP-TP-064, the HENC TMU report, the HENC calibration report and the associated NDA BDRs.

### **Observation 2**

VE BDRs LA-VE-54-0001 and LA-VE-54-0002 included drums that did not have punctured rigid liner lids. The condition was identified by RTR and NCRs were properly issued. The VE BDRs should reference the RTR NCRs so it is clear that the non-punctured liners did not require that VE operations issue NCRs. The liners were vented during VE.

### **Observation 3**

Various NDA documents (i.e., calibration reports, TMU reports) for the PTGS/FRAM had not been brought into the CCP Document Control System.

### **Observation 4**

Both VE and RTR operators estimate the VUP during container examination. The method for estimating this value is not specified in the procedures. RTR operators estimate the VUP based on the top of the drum liners and the VE operators estimate the VUP based on the top of the waste in the container. LANL/CCP should ensure the RTR and VE operators use a consistent method to estimate VUP. LANL/CCP should also consider using the WWIS terminology, "Fill Factor" instead of VUP.

### **Observation 5**

The LANL/CCP software control program was still in the process of being implemented. The SQA personnel have identified the applicable software and understand the activities needed to complete the process. Items to be completed were:

- Records had been assembled but not entered into the LANL/CCP records program.
- Licensed software is still in LANL's name. CCP is operating the equipment, and the LANL/CCP needs to ensure there are no legal issues with this arrangement.
- Testing and cell listing for the PTGS-Analysis-R1.xls was not available at the time of the audit.

## **6.2 Recommendations**

The audit team provided the following two Recommendations to LANL/CCP management for improvement of the LANL/CCP processes and procedures.

### **Recommendation 1**

The AK audit team recommended that several changes be made to the AK summary reports for waste stream LA-NHDO1.001 and LA-MIN03-NC.001. In addition, the EPA AK Inspector raised several issues/questions that will be addressed in the EPA inspection report for this audit. It was recommended that the changes to the two AK summary reports be made and that the LANL/CCP AK personnel implement the appropriate changes in the AK processes that will address the EPA issues and questions. The changes, questions, and recommendations have been provided to the LANL/CCP Manager, SPM, and LANL Site Technical Representative (STR) for consideration.

### **Recommendation 2**

The WWIS data entry procedure, CCP-TP-030, Section 4.6.4, did not specify that the data entry process is initiated by pressing the "Load" button to upload the spreadsheet data to the WWIS. It is recommended that LANL/CCP perform a review of the procedure and a walk-through to verify that all critical steps are clearly defined and addressed.

## **7.0 ATTACHMENTS**

Attachment 1: Personnel Contacted During the Audit

Attachment 2: Summary Table of Audit Results

Attachment 3: LANL/CCP Documents/Procedures Evaluated During the Audit

PERSONNEL CONTACTED DURING THE AUDIT				
NAME	TITLE/ORG	PRE AUDIT MEETING	CONTACTED DURING AUDIT	POST AUDIT MEETING
Adams, Andrew	VE Operator Trainee (LANL/CCP)		X	X
Anderson, Stephan	RCT/LANL (CCP)		X	
Anghel, Joana	HSG Chemist (LANL/CCP)		X	
Apperson, Courtney	LANL			X
Aragon, Israel	Drum Sampler (LANL/CCP)	X	X	
Baker, Shannan	LANL			X
Baros, Ricky	VE Operator (LANL/CCP)		X	
Becker, Cindi	Training (CCP)		X	
Bernel, Cory	RCT (LANL/CCP)		X	
Brown, Beverly	NDA ITR/Operator (CCP)		X	
Ceo, R. N.	NDA EA (LANL/CCP)		X	X
Cramer, Doug	NDA TS (LANL/CCP)		X	X
Davidson, Craig	NDA TS (LANL/CCP)	X	X	X
Doherty, Mark	AKE/SPM (CCP)	X	X	
Drake, Tracy	Records Analyst (CCP)		X	X
Ecclesine, Amy	LANL	X		
Estill, Wesley	AKE (CCP)			X
Fisher, AJ	Project QA (CCP)	X	X	
Fitzgerald, Randy	AKE (CCP)	X	X	
Freeze, Deborah	Training Spec (CCP)	X	X	
French, Sean	LANL	X		

PERSONNEL CONTACTED DURING THE AUDIT				
NAME	TITLE/ORG	PRE AUDIT MEETING	CONTACTED DURING AUDIT	POST AUDIT MEETING
Galle, Lane	(CCP)		X	
Garcia, Joseph	HSG Sampler (LANL/CCP)	X	X	
Garcia, Mary Ann	LANL			X
Gerlock, Chadwick	NDA ITR/Operator (LANL/CCP)		X	
Gibson, Yvonne	LANL			X
Gillespie, Bruce	NDA/Canberra	X	X	X
Gran, John	SPQAO (CCP)	X	X	
Granzow, Howard	LANL			X
Gutierrez, Ben	AKE (CCP)			X
Haar, Dave	Deputy Manager (CCP)	X	X	X
Hardesty, Bill	HSG Chemist (LANL/CCP)		X	
Hargis, Ken	LANL			X
Harvill, Joe	CCP NDA (CCP)	X	X	
Hedahl, Tim	CCP Manager (CCP)	X		X
Huchton, Roger	LANL	X		X
Jones, Robert	LANL	X		X
Keeney, Christina	LANL			X
Lichliter, Kenneth	Tech. Spec. (CCP)	X		
Lindahl, Peter	TSM (LANL/CCP)	X		X
Lopez, Jerry	WDS (LANL/CCP)		X	
Lopez, Joshua	WPS Tech. (LANL/CCP)		X	
McTaggart, Kevin	(CCP)		X	

PERSONNEL CONTACTED DURING THE AUDIT				
NAME	TITLE/ORG	PRE AUDIT MEETING	CONTACTED DURING AUDIT	POST AUDIT MEETING
Maestas, Benito	NDA Op. (LANL/CCP)		X	
Maupin, James	SPQAO (CCP)	X	X	
Marczak, S.	HSG Op/Chemist (LANL/CCP)		X	
Martinez, Harold	RCT (LANL/CCP)		X	
Martinez, Leon	NDE Operator (LANL/CCP)		X	
Martinez, Paul	NDA/NDE Team Leader (LANL/CCP)	X	X	X
Melton, Jesse	HSG SME (CCP)		X	
Montoya, Andrew	LANL			X
Montoya, Rick	LANL		X	
Miller, J. T.	HSG RCT (LANL/CCP)		X	
Miller, Scott	LANL	X		X
Mojica, Lee	NDA Tech (LANL/CCP)		X	X
Mojica, Tommy	VE Operator/Expert (LANL/CCP)		X	
Nunz, James	WM Mgr/LASO DOE			X
Osborne, Estela	Document Services (CCP)	X		
Orban, Jim	LANL			X
Pearcy, Sheila	Lead Record Custodian (CCP)	X	X	X
Penela, Eric	Gen Mgr/MCS	X		
Peterman, Sue	STR/LANL	X	X	X
Porter, Larry	SPM (CCP)	X	X	

PERSONNEL CONTACTED DURING THE AUDIT				
NAME	TITLE/ORG	PRE AUDIT MEETING	CONTACTED DURING AUDIT	POST AUDIT MEETING
Poths, Harold	NDA SME (LANL/CCP)		X	X
Powell, Mark	SQAO (LANL/CCP)	X	X	
Riggs, Matt	LANL	X		X
Romero, Bobby	Glovebox Team Lead (LANL/CCP)	X	X	
Romero, Kenneth	NDA Op/ITR/TS (LANL/CCP)		X	X
Romero, Myrna	LANL			X
Root, Wesley F.	VPM (CCP)	X	X	
Schaffer, Steve	AKE (CCP)	X	X	
Sheridan, Pat	LANL	X		
Smith, Deborah	Weston			X
Stepzinski, Chuck	Document Services (CCP)	X	X	
Stroble, J. R.	WCO (CCP)		X	
Sullivan, Jeri	HSG Op/Chemist (LANL/CCP)		X	
Trujillo, Barbara	WWIS Data Entry/WCO (LANL/CCP)		X	X
Valdez, Joe	VE Operator (LANL/CCP)		X	
Vancil, Sherri	DOE Albuquerque	X	X	X
Veilleux, John	NDA Team Lead (LANL/CCP)		X	X
Vecker, Barbara	LANL			X
Vigil, Christopher	WDS (LANL/CCP)		X	
Vigil, Jack	NDE Op/SME (LANL/CCP)	X	X	X



PERSONNEL CONTACTED DURING THE AUDIT				
NAME	TITLE/ORG	PRE AUDIT MEETING	CONTACTED DURING AUDIT	POST AUDIT MEETING
Voss, Susan	LANL	X	X	
Vozella, Joe	LASO			X
Wachter, Joseph	NDA ITR/FQAO (LANL/CCP)	X	X	X

Summary Table of Audit Results

QA / TECHNICAL ELEMENTS	CARs	CDAs	OBSS	RECs	Program Adequacy	Program Implementation	Program Effectiveness
Acceptable Knowledge	CAR 04-025 (012)			#1	A	S	E
Sample Design / Reconciliation of DQOs					A	S	E
Headspace Gas Sampling and Analysis					A	S	E
Nondestructive Assay (HENC)	CAR 04-024 (011)	#1, #4, #5	#1		A	S	E
Nondestructive Assay (TGS, FRAM)					A	S	E
RTR (Systems 1 & 2)	CAR 04-021 (002, 004)	#2	#4		A	S	E
Organization / QA Program					A	S	E
Software QA			#5		A	M	M
Procurement					A	S	E
Document Control			#3		A	S	E
Logbooks / Container Mgmt, M&TE for Data Collection					A	S	E
Inspection/Test Control					A	S	E
Program Interfaces / Statement of Work					A	S	E
NCRs / Corrective Action					A	S	E
Project Level Data V&V	CAR 04-022 (006)				A	M	M
Visual Examination			#2		A	S	E
Assessments					A	S	E
WWIS Data Entry				#2	A	S	E
Control of Items / Handling, Storage, Shipping					A	S	E
Personnel Qualification / Training					A	S	E
Graded Approach		#3			A	S	E
Records Management	CAR 04-023 (007)				A	M	M
PDP Participation					I	I	I
SUMMARY	5 (6 Concerns)	5	5	2	A	S	E

CARs = Corrective Action Reports; CDAs = Corrected During the Audit; OBSS = Observations; RECs = Recommendations  
ADEQUACY/EFFECTIVENESS STATEMENTS: A = Adequate; S = Satisfactory; UNSAT = Unsatisfactory; E = Effective; I = Indeterminate; M = Marginal;

## LANL/CCP DOCUMENTS/PROCEDURES EVALUATED DURING THE AUDIT

Number	Procedure Number/Rev	DOCUMENT TITLE
<b>CCP PROGRAM DOCUMENTS</b>		
1	CCP-PO-001 Rev. 8	CCP Transuranic Waste Characterization Quality Assurance Project Plan
2	CCP-PO-002, Rev. 9	CCP Transuranic Waste Certification Plan
3	CCP-PO-008 Rev. 4	CCP Quality Assurance Interface with the WTS Quality Assurance Program
4	CCP-PO-012 Rev. 3	CCP/LANL Interface Document
5	LANL/WTS SOW	Los Alamos National Laboratory (LANL) Statement of Work for Characterization of LANL TRU Waste
<b>CCP QUALITY ASSURANCE PROCEDURES</b>		
6	CCP-QP-001 Rev. 2	CCP Graded Approach
7	CCP-QP-002 Rev. 15	CCP Training and Qualification Plan
8	CCP-QP-004 Rev. 5	CCP Corrective Action Management
9	CCP-QP-005 Rev. 9	CCP TRU Nonconforming Item Reporting and Control System
10	CCP-QP-006 Rev. 5	CCP Corrective Action Reporting and Control
11	CCP-QP-008 Rev. 9	CCP Records Management
12	CCP-QP-009 Rev. 3	CCP Work Control Process
13	CCP-QP-010 Rev. 11	CCP Document Preparation, Approval and Control
14	CCP-QP-011 Rev. 4	CCP Notebooks and Logbooks
15	CCP-QP-015 Rev. 6	CCP Procurement
16	CCP-QP-016 Rev. 8	CCP Control of Measuring, Testing, and Data Collection Equipment
17	CCP-QP-017 Rev. 2	CCP Identification and Control of Items
18	CCP-QP-018 Rev. 3	CCP Management Assessment
19	CCP-QP-019 Rev. 2	CCP Quality Assurance Reporting to Management
20	CCP-QP-021 Rev. 3	CCP Surveillance Program
21	CCP-QP-022 Rev. 3	CCP TRU Software Quality Assurance
22	CCP-QP-023 Rev. 1	CCP Handling, Storage, and Shipping

## LANL/CCP DOCUMENTS/PROCEDURES EVALUATED DURING THE AUDIT

Number	Procedure Number/Rev	DOCUMENT TITLE
23	CCP-QP-026 Rev. 6	CCP Inspection Control
24	CCP-QP-027 Rev. 2	CCP Test Control
25	CCP-QP-028 Rev. 5	CCP Records Filing, Inventorying, Scheduling, and Dispositioning
<b>CCP TECHNICAL PROCEDURES</b>		
26	CCP-TP-001 Rev. 10	CCP Project Level Data Validation and Verification
27	CCP-TP-002 Rev. 13	CCP Reconciliation of DQOs and Reporting Characterization Data
28	CCP-TP-003 Rev. 14	CCP Sampling Design and Data Analysis for RCRA Characterization
29	CCP-TP-005 Rev. 13	CCP Acceptable Knowledge Documentation
30	CCP-TP-028 Rev. 2	CCP Radiographic Test and Training Drum Requirements
31	CCP-TP-030 Rev. 11	CCP TRU Waste Certification and WWIS Data Entry
32	CCP-TP-043 Rev. 1	CCP Chain of Custody for SUMMA® Canister Sampling Using the INEEL Lab
33	CCP-TP-053 Rev. 0	CCP Standard Real-Time Radiography (RTR) Inspection Procedure
34	CCP-TP-056 Rev. 2	CCP HSG Performance Demonstration Plan
35	CCP-TP-058 Rev. 1	CCP NDA Performance Demonstration Plan
36	CCP-TP-063 Rev. 4	CCP Operating the High Efficiency Neutron Counter Using NDA 2000
37	CCP-TP-064 Rev. 2	CCP Calibrating the High Efficiency Neutron Counter Using NDA 2000
38	CCP-TP-082 Rev. 2	CCP Preparing and Handling Waste Drums for Headspace Gas
39	CCP-TP-093 Rev. 2	CCP Sampling of TRU Waste Containers
40	CCP-TP-098 Rev. 2	CCP Installing of the NucFil HSG Sample Port
41	CCP-TP-103 Rev. 3	CCP Data Reviewing, Validating, and Reporting for the High Efficiency Neutron Counter Using NDA 2000
42	CCP-TP-106 Rev. 1	CCP Headspace Gas Sampling Batch Data Report Preparation
43	CCP-TP-113 Rev. 1	CCP Waste Visual Examination
44	CCP-TP-120 Rev. 1	CCP Container Management